Spectrum and Propagation Measurements

The radio spectrum is a natural resource that offers immense benefit to industry, private citizens, and government by supporting a wide range of radio and wireless applications for communications and sensing. Unlike many other natural resources, the spectrum is non-depleting so it can be used indefinitely. However, the rapidly increasing number of radio devices and active competition for improved access to the radio spectrum suggests that its effective use will require increasingly more complex knowledge of the existing signals environment, as well as understanding the technical and operational factors that can cause interference between systems that share the spectrum.

NTIA manages the Federal Government's use of the spectrum to ensure maximum benefit to all users while accommodating additional users and new services. Efficient and effective use of the spectrum is a key element in both the NTIA and the ITS missions.

The Spectrum and Propagation Measurements Division of ITS performs measurements of radio signals to support research and engineering enabling more efficient and effective use of the spectrum. Major tools in this work include the Radio Spectrum Measurement System (RSMS), a van full of very capable computer-controlled radio measurement devices, and the Table Mountain Field Site and Radio Quiet Zone.

The following areas of emphasis are indicative of the work done recently in this Division to support NTIA, industry, and other Federal agencies.

Areas of Emphasis

Radio Spectrum Measurement System (RSMS) Operations
The Institute uses the RSMS to perform measurements of emission characteristics of new or proposed systems, of spectrum occupancy to determine the level of crowding, of EMC characteristics, and to resolve interference problems. The project is funded by NTIA.

RSMS-4 Development
The Institute develops RSMS-4 measurement hardware and software capabilities to provide RSMS-4 systems with greatly improved measurement and digital signal processing modes. System software will provide very flexible control, remote monitoring, uniform data recording and storage, and powerful analysis and display routines. The project is funded by NTIA.

Table Mountain Research
The Institute uses the special facilities at an 1800-acre radio quiet zone to perform a wide range of critical spectrum measurements and research. This year such research has included DTV measurements, background noise research, and detailed radar measurements. The project is funded by NTIA.

Spectrum Efficiency Research
The Institute investigates ways that Federal agencies can make more efficient and effective use of the spectrum to accomplish their respective missions. Recently this work is evaluating the use of the 162-174 MHz band by Federal agencies in the Washington, DC area to assess the hypothetical merits of moving separate Federal mobile radio systems onto various types of common shared radio systems. This work is funded by NTIA.

Ultrawideband Regulatory Support
The Institute continues measurements to characterize ultrawideband (UWB) devices and interference to conventional radio systems. Current work includes measurements of devices that mix UWB techniques with frequency-hopping or other modes and technical consultation on proposed regulatory changes. The project is funded by NTIA.